

NON-PUBLIC?: N
ACCESSION #: 9006200233
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Millstone Nuclear Power Station Unit 3 PAGE: 1 OF 3

DOCKET NUMBER: 05000423

TITLE: Manual Reactor Trip Due to Imminent Loss of Condenser Vacuum
EVENT DATE: 05/10/90 LER #: 90-014-00 REPORT DATE: 06/11/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 060

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Barrett W. Nichols, Senior Engineer, X5493

TELEPHONE: (203) 447-1791

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On May 19, 1990 at 2033 hours with the plant in Mode 1 at 60% power, a manual reactor trip was initiated because of an anticipated turbine trip due to loss of condenser vacuum. Circulating Water Pump 3CWS-P1B was providing cooling water for Condenser Waterboxes "A" and "B". A rapid buildup of seaweed on "B" Traveling Screen resulted in an automatic trip of 3CWS-P1B. The plant was in the process of downpowering as a result of weather effects on condenser cooling water equipment in the intake structure. As the loss of cooling to two condenser bays would have resulted in a low condenser vacuum, a reactor trip was initiated. The reactor trip caused a Main Turbine and Generator trip in accordance both design.

Root cause of this event was design deficiency in that the Traveling Screen capacity was inadequate. A contributing cause was the peak

seaweed season.

As corrective action, the Traveling Screen units in a number of bays will be redesigned and modified per the recommendations of an internal Task Force. Two of these units will be modified in the next year. Personnel have been instructed to evaluate intake structure conditions more frequently and procedures modified to allow power reductions at a faster rate.

END OF ABSTRACT

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I. Description of Event

On May 19, 1990, at 2033 hours with the plant in Mode 1 at 60% power, at 580 degrees Fahrenheit and 2250 psia, a manual reactor trip was initiated because of an anticipated turbine trip due to loss of condenser vacuum. The plant had five of six circulating water pumps in operation with Circulating Water Pumps 3CWS-P1A and its associated traveling screen shut down for repairs. Circulating Water Pump 3CWS-P1B was providing cooling water for Condenser Bays "A" and "B". A rapid buildup of seaweed on the "B" Traveling Screen resulted in an automatic trip of 3CWS-P1B due to high screen differential level. As the loss of cooling to two condenser bays would have resulted in a low condenser vacuum, a reactor trip was initiated. The reactor trip caused a Main Turbine and Generator trip in accordance with design.

At 1600 hours, winds were from the southeast at 9.2 mph. At 1800 hours, winds began to increase. An evaluation of plant conditions was performed in accordance with the applicable procedures. Based on the evaluation due to rapidly deteriorating conditions, a down power was commenced at 1942 hours. At 1955 hours, winds peaked at 27 mph from the southeast. The "A" Condenser Waterbox was isolated to reduce total flow through the "B" Circulating Water Pump. At 2012 hours, the traveling screens shifted to fast speed due to high debris loading (i.e., a differential level above 9 inches water column). After the normal cycle, the screens returned to slow speed. At 2027 hours, the screens returned to fast speed followed by the high traveling screen differential level annunciator indicating that differential level across the screens was above 18 inches water column. At 2033 hours, the "B" Circulating Water Pump automatically tripped on high Traveling Screen differential level (30 inches water column).

At the time of the trip, operators verified that the Reactor Trip

and By-pass Breakers were open, that all control rods were fully inserted and that neutron flux was decreasing. A Feedwater Isolation was received due to low Average Reactor Coolant system temperature following the trip. An Auxiliary Feedwater actuation occurred as a result of a steam generator low-low level signal. These are normal plant responses following a trip. No additional Engineered Safety Features were required or initiated. All safety systems were fully operable at the time of the trip, and all plant systems performed as designed in response to the trip. Plant stability was achieved at 2045 hours.

II. Cause of Event

The root cause of this event was design deficiency in that Traveling Screen capacity was inadequate.

Two contributing factors to the trip were: the time of year and the "A" Circulating Water Pump bay being out of service. Peak seaweed loadings occur in April - May and September - October. With the "A" Circulating Water Pump out of service, the trip of the "B" Circulating Water Pump will result in a plant trip.

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III. Analysis of Event

This event is being reported in accordance with 10CFR50.73(a) (2) (iv), as an event or condition that resulted in manual actuation of an Engineered Safety Feature. Immediate notifications were performed in accordance with 10CFR50.72(b)(2)(ii).

The safety significance of the event is minimal as the trip was manually initiated because a turbine trip due to loss of vacuum was imminent. Power level was 100% at 1942 hours when a down power was initiated in order to reduce the transient that the impending reactor trip would have on the plant. Down powering is initiated to bring the plant to a condition where a turbine trip would not result in a reactor trip. Power level was at 60% when 3CWS-P1B tripped on high traveling screen differential level (30").

Operation of the Service Water system was not jeopardized due to the ratio of Service Water System flow (approximately 15,000 gallons per minute) to circulating water pump flow (approximately 150,000 gallons per minute) for one bay. When a Circulating Water pump trips, the reduction in flow results in a reduced differential level across the traveling screens.

IV. Corrective Action

The immediate corrective action was to remove the debris from the traveling screen. Corrective action to prevent recurrence is to implement design changes to the traveling screen units. These changes will increase the speed of the traveling screens and increase their carrying capacity. Based on preliminary engineering scope and equipment availability, these changes are expected to be implemented on two of the traveling screens within the next year.

In the interim, the procedures which evaluate the intake structure conditions and initiate down powers have been revised to change the point at which a down power is initiated and to increase the down power rate. A memo has been circulated to operations personnel to increase the frequency at which intake structure conditions must be evaluated and to ensure that management is kept informed of deteriorating conditions.

V. Additional Information

Licensee Event Report (LER) numbers 86-035, 88-014, 88-024, 89-008, 90-011 and 90-013 are similar in that a reactor trip due to a turbine trip resulted when fouling of the intake screens caused circulating water pumps to trip causing condenser vacuum to decrease.

In LER 90-013, it was identified that with the "A" and "B" Condenser Waterboxes cross-connected, flow across the "B" Traveling Screen is 130% of normal. Prior to the trip the cross-connect between the two bays had been closed to prevent high flows across the screens. Modifications to the Trash Rake performed as part of this LER were not effective as the debris which built up on the intake screens passed through the trash racks.

In LER 90-011 a number of short term modifications were identified to increase the removal efficiency of the traveling screens. These modifications performed as designed but were still not able to cope with the amount of debris experienced. In the long term, an increase in traveling screen speed and carrying capacity will minimize the number of future trips of this type.

EIIS CODES

Systems Components

Circulating Water System - KE Pumps - P

Traveling Water Screens - SCN
Condenser - COND

ATTACHMENT 1 TO 9006200233 PAGE 1 OF 1

General Offices, Selden Street, Berlin Connecticut

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June 11, 1990
MP-90-576
Re: 10CFR50.73(a)(2)(iv)

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Reference: Facility Operating License No. NPF-49
Docket No. 50-423
Licensee Event Report 90-014-00

Gentlemen:

This letter forwards Licensee Event Report 90-014-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(iv), any event or condition that resulted in manual actuation of the Reactor Protection System (RPS).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace
Director, Millstone Station

SES/BWN:mo

Attachment: LER 90-014-00

cc: T. T. Martin, Region I Administrator
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2
and 3
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 3

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